# Patient-rated outcomes of lumbar fusion in patients with degenerative disease of the lumbar spine: does age matter?

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Abstract: STUDY DESIGN: Single centre retrospective study of prospectively collected data, nested within the Eurospine Spine Tango data acquisition system. OBJECTIVE: The aim of this study was to assess the patient-rated outcome and complication rates associated with lumbar fusion procedures in three different age groups. SUMMARY OF BACKGROUND DATA: There is a general reluctance to consider spinal fusion procedures in elderly patients due to the increased likelihood of complications. METHODS: Before and at 3, 12, and 24 months after surgery, patients completed the multidimensional Core Outcome Measures Index (COMI). At the 3-, 12-, and 24-month follow-ups they also rated the Global Treatment Outcome (GTO) and their satisfaction with care. Patients were divided into three age groups: younger ( 50y < 65y; n = 317), older ( 65y < 80y; n = 350), and geriatric ( 80y; n = 40). RESULTS: 707 consecutive patients were included. The preoperative comorbidity status differed significantly ($p < 0.0001$) between the age groups, with the highest scores in the geriatric group. Medical complications during surgery were lower in the younger age group (7%) than in the older (13.4%; $p = 0.006$) and geriatric groups (17.5%; $p = 0.007$); surgical complications tended to be higher in the elderly group (younger, 6.3%; older, 6.0%; geriatric, 15.0%; $p = 0.09$). There were no significant group differences ($p > 0.05$) for the scores on any of the COMI domains, GTO, or patient-rated satisfaction at either 3-, 12-, and 24-months follow-up. CONCLUSIONS: Despite greater comorbidity and complication rates in geriatric patients, the patient-rated outcome was as good in the elderly as it was in younger age groups up to two years after surgery. These data indicate that geriatric age needs careful consideration of associated risks but is not per se a contraindication for fusion for lumbar degenerative disease. LEVEL OF EVIDENCE: 4.

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# Patient-Rated Outcomes of Lumbar Fusion in Patients with Degenerative Disease of the Lumbar Spine: Does Age Matter?

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Abstract

Study Design: Single centre retrospective study of prospectively collected data, nested within the Eurospine Spine Tango data acquisition system.

Objective: The aim of this study was to assess the patient-rated outcome and complication rates associated with lumbar fusion procedures in three different age groups.

Summary of background data: There is a general reluctance to consider spinal fusion procedures in elderly patients due to the increased likelihood of complications.

Methods: Before and at 3, 12, and 24 months after surgery, patients completed the multidimensional Core Outcome Measures Index (COMI). At the 3-, 12-, and 24-month follow-ups they also rated the Global Treatment Outcome (GTO) and their satisfaction with care. Patients were divided into three age groups: younger (≥50y <65y; n = 317), older (≥65y <80y; n = 350), and geriatric (≥ 80y; n = 40).

Results: 707 consecutive patients were included. The preoperative comorbidity status differed significantly ($p<0.0001$) between the age groups, with the highest scores in the geriatric group. Medical complications during surgery were lower in the younger age group (7%) than in the older (13.4%; $p=0.006$) and geriatric groups (17.5%; $p=0.007$); surgical complications tended to

be higher in the elderly group (younger, 6.3%; older, 6.0%; geriatric, 15.0%; p=0.09). There were no significant group differences (p>0.05) for the scores on any of the COMI domains, GTO, or patient-rated satisfaction at either 3-, 12-, and 24-months follow-up.

Conclusions: Despite greater comorbidity and complication rates in geriatric patients, the patient-rated outcome was as good in the elderly as it was in younger age groups up to two years after surgery. These data indicate that geriatric age needs careful consideration of associated risks but is not per se a contraindication for fusion for lumbar degenerative disease.

**Key Words:** Lumbar fusion, lumbar spine, degenerative spondylolisthesis, degenerative disease, disc degeneration, age, geriatric patient, patient-rated outcome, complication rate, spinal fusion
**Level of Evidence:** 4



## Introduction

Worldwide the average age of the population is increasing. The elderly are projected to be the fastest growing sector of the population and the surgical treatment of their degenerative spine conditions is becoming increasingly challenging. The general increase in the number of older patients presenting with degenerative diseases of the lumbar spine will likely be paralleled by an increase in the number referred to the spinal surgeon for possible lumbar fusion. Age and associated co-morbidities represent important determinants of perioperative complications, in particular with extensive surgical spinal procedures [1-5].

There is a general reluctance to consider spinal fusion in older patients, especially in the geriatric population, given the increased likelihood of complications, greater costs, and longer hospital stay. Despite numerous advances in surgical techniques and perioperative care, the outcome of spinal fusion may be expected to be poorer in the elderly due to their lower bone

quality and increased susceptibility to complications [5,6]. To date there is little data on the clinical outcome of spinal fusion in older patients, with most studies comprising only small study groups [4,7-10]. Reports of the clinical outcome of geriatric patients (>80 years of age) who have undergone lumbar fusion are particularly rare. Patient-reported outcome measures help avoid bias in the reporting of surgical success [11-13] and provide an important insight into the impact of surgery from the patient's perspective [14], allowing the collection of quantitative data regarding pain, function, and health-related quality of life [15].

The aim of this study was to compare patient-rated outcome, complication rates, and length of hospital stay among groups of younger (≥50y <65y), older (≥65y <80y), and geriatric (≥ 80y) patients undergoing lumbar fusion for degenerative disease.

## Materials and Methods

### *Patient data, inclusion criteria, and age groups*

This was a single centre study nested within the Eurospine Spine Tango data acquisition system. It comprised a retrospective analysis of prospectively collected data. Cases were identified using the Spine Tango system and our local Spine Surgery Outcomes database and were verified by cross-checking with the information in our local Clinic Information System. Inclusion criteria, as documented on the Spine Tango surgery form (completed with approximately 85% compliance for all patients operated at our institution during the time period in question) were: consecutive patients between 2004 and 2011 who underwent one to three level posterior instrumented fusion with or without decompression and with or without anterior support (transforaminal or posterior lumbar interbody fusion) due to degenerative disease of the lumbar spine; German or English speaking (or in more recent years (after 2007), also Spanish, Italian, French, or Portuguese speaking). Patients with previous spine surgery were excluded from the study. Patients were

selected for surgery according to the case-by-case decision of our case review committee based on discussion of the patient's clinical symptoms, radiological findings, response to infiltration therapy, history of and response to conservative therapies, comorbidities, and degree of suffering.

Patients were divided into three age-groups according to their age at the time of surgery: "younger" (≥50y <65y); "older" (≥65y <80y), and "geriatric" (≥ 80y) patients. There are no standard definitions characterising the terms "older" or "elderly". In the present study, the chosen cut-off for considering patients as "older" was based on the fact that most developed countries have accepted the chronological age of 65 years (at which a person becomes eligible for occupational retirement) as a definition of "older". The cut-off for considering patients as "geriatric" is much less well defined and generally ranges from >75 to >85 years.
A time period of 15 years was defined for the "younger" group in order to equal that for the "older" group.

*Data acquisition system, patient-orientated questionnaires, and follow-up visits*

The following data were documented by the physician during the hospital stay, using the Spine Tango Surgery form [16]: pathology, previous treatment, patient comorbidity status assessed with the American Society of Anesthesiologists Physical Status Score (ASA score; as evaluated by the anaesthetist based on an interview with the patient and review of the patient records), surgical procedure, number of affected levels, duration of surgery (in categories, from <1 h to >10 h), blood loss (in categories from none to >2,000 ml), duration of hospital stay, and both medical and surgical complications. The latter were recorded on the Tango form, for the period from admission to discharge, by means of multiple choice options of the most common complications: medical complications comprised anaesthesiological, cardiovascular, pulmonary, cerebral, kidney/urinary, liver/GI, death, or other; surgical complications comprised wrong level surgery,

nerve root damage, cauda equina damage, spinal cord damage, bleeding in the spinal canal, bleeding outside the spinal canal, malposition of the implant, dural tear, wound infection, implant failure, and other.

Patients completed the multidimensional Core Outcome Measures Index (COMI) before surgery and 3, 12, and 24 months after surgery [17]. The questionnaire was sent to the patients by post, to be completed at home. The COMI (scored 0-10) consists of single items covering the domains of pain (back and leg/buttock pain separately), function, symptom specific well-being, general quality of life, and social and work disability (job, school, housework) [11,17]. At 12-months follow-up, patients also rated the Global Treatment Outcome (GTO) with a question enquiring as to how much the operation had helped the back problem, overall (with five response categories from ‘‘helped a lot’’ to ‘‘made things worse’’) [12,18-20]. Patient-rated satisfaction with care was also rated using five response categories (‘‘over the course of treatment for your back problem how satisfied were you with the medical care in our hospital?’’: (1) very satisfied, (2) satisfied, (3) neither satisfied nor dissatisfied, (4) dissatisfied, and (5) very dissatisfied. These categories were dichotomised into ‘‘satisfied’’ (1 and 2) and ‘‘dissatisfied’’ (3, 4 and 5) for the ease of presentation and greater power in the subsequent statistical analyses. Patients were asked whether they had undergone any further operation(s) on their lumbar spine (back) in our hospital or in other hospitals during the follow-up period. Patients were usually seen at the outpatient clinic at 3, 6, 12, and 24 months' post-surgery.

Patient-rated questionnaires were intentionally administered independently of the clinical follow-up visits to ensure that the questionnaires were completed regardless of the patient's ability/desire to return to the hospital and that the information collected was free of any care-provider influence and hence not biased [13].

*Statistical analyses*

Descriptive data are presented as means ± standard deviation (SD). The significance of any age-group differences for continuous, normally distributed data was analyzed using analysis of variance followed by Fisher's PLSD posthoc tests to identify the location of the differences. Contingency analyses with Chi-squared were used to analyze associations between the age groups and categorical variables. The global outcome was dichotomized as ''good'' (= operation helped or helped a lot) and ''poor'' (= operation only helped a little, did not help, made things worse) for some analyses. Patient-rated satisfaction was dichotomized as "good" (= satisfied and very satisfied) and "poor" (= neither satisfied nor dissatisfied, somewhat dissatisfied, and very dissatisfied). Statistical significance was accepted at the $P<0.05$ level.

Results

*Overall study group and surgical characteristics*

A total of 707 consecutive patients comprising 317 younger (≥50y <65y), 350 older (≥65y <80y), and 40 geriatric patients (≥80y) were identified for analysis. With the exception of preoperative comorbidity status (greatest in the geriatric group) and back pain score (greater in the younger group than the older group), baseline characteristics did not differ significantly among the three age-groups ($p>0.05$). The baseline characteristics of each age group are given in Table 1.

Table 2 shows the surgical data for the three age groups. The percentage of patients with pathology extending to more than one level was significantly higher ($p=0.006$) in the older group than the younger group. There were no significant group differences for the duration of the operation. The geriatric group had a significantly greater blood loss than the younger group ($p=0.007$). Medical complications were higher ($p\leq0.007$) in both the geriatric group (17.5%) and the older group (13.4%) compared with the younger group (6.3%). There was also a non-

significant trend (p=0.09) for higher surgical complications in the geriatric group (15.0%) than in the other two groups (each approximately 6.0%). Duration of hospital stay was slightly but significantly longer in the older age group than in the younger age group (p=0.007).

*Patient rated outcomes*

Preoperative questionnaires were completed by 98% of the patients. At 3, 12, and 24-months' follow-up, 95%, 91%, and 89% patients, respectively, returned a completed questionnaire. Three months after surgery a good global outcome (operation helped/helped a lot) was reported by 84.6% in the younger group, 83.3% in the older group, and 71.8% in the geriatric group (p = 0.06 for difference among groups). A total of 89% of patients in the younger group, 88.3% in the older group and 94.9% in the geriatric group were satisfied/very satisfied with their care (p=0.46 for difference among groups). There was a statistically significant (p<0.001) and clinically relevant reduction in the multidimensional COMI score 3 months after surgery in the whole patient group, with no significant difference (p=0.45) between the groups for the extent of the reduction (Figure 1). The COMI score as well as the domain scores for function, symptom-specific well-being, and social and work disability demonstrated a further statistically significant improvement (p<0.05) at the one-year follow-up (Figure 1). The reduction in pain scores and improvement in general quality of life remained stable from 3-months to 1-year follow-up (Figure 1). There was no significant difference between the three age groups for any of the patient-rated outcomes at one year after surgery (Table 3). Two-year follow-up revealed no significance difference between the groups for satisfaction with care (p=0.13), GTO (p=0.23) or COMI (p=0.44) or any of its component domains (p>0.05) **(Figure 1)**.

Discussion

The present study demonstrated that younger (≥50y <65y), older (≥65y <80y), and geriatric (≥80y) patients report similar patient-rated outcomes up to one year after short posterior instrumented fusion of the lumbar spine, even though preoperative comorbidity status, medical complications, and length of hospital stay are all greater in the geriatric/older age groups. It is of importance to note that 3 months postoperatively geriatric patients reported a poor global outcome almost twice as frequently (28%) as did the younger patients (15%). However, at 12 months postoperatively the global outcome was rated as "good" to a similar extent in all three age groups (83% - 85%). This may indicate that geriatric patients need a longer recovery period to experience the benefit of surgery.

The sector of the population comprising geriatric persons (aged 80 years and older) is the fastest growing sector of the whole population [21,22]. Elderly patients often wish to continue their physical activities beyond retirement age and to stay active and mobile into their golden age. Most previous studies on posterior lumbar interbody fusion in elderly patients have focused on complication rates and, to a lesser extent, on clinical results [4,5,23,24]. Reports on patient-rated outcome in older and geriatric patients are rare, often lack a comparison with a control group, and involve only a small number of patients. However, in good agreement with our findings, the majority report that older patients (over 70 years of age) benefit as much from lumbar spinal fusion as do younger patients [7,24-26].

Okuda et al. [7] compared 31 patients >70 years of age with 70 patients <70 years of age and found that elderly patients demonstrated satisfactory clinical and radiographic results, similar to those in younger patients. Acosta et al. [26] found perioperative events, intermediate-term clinical outcomes (mean follow-up of 19 months), and fusion rates after multilevel 360-degree lumbar fusion in the elderly (>65 years, n = 30) comparable to those of younger patients (<65 years, n = 43). Crawford and colleagues [10] analysed prospectively collected health-related

QoL outcomes in 35 patients (≥75 years of age) who underwent lumbar one- or two-level fusion and found significant improvement in all outcome measures from preoperative to 2-yearsfollow-up. However, the study lacked a comparison with a control group of younger patients. In another larger series without a control group Becker et al [27] retrospectively analysed 195 patients aged 70 to 89 years who had undergone lumbar spinal fusion and found a significant reduction in leg pain and back pain as well as improvement in ODI and SF-36 scores over a 2-year period.

Glassman and colleagues [25] compared the patient-rated outcome measures of 50 patients >65 years and a large group of 174 patients <65 years who underwent single-level posterolateral lumbar arthrodesis. They found that the older patients demonstrated even higher mean improvements in Oswestry Disability Index (ODI) scores and Medical Outcomes Study Short Form-36 (SF-36) scores as well as equal improvements in back pain and greater improvements in leg pain when compared to the younger group [25]. Similar to the findings of our study, they demonstrated that perioperative complications do not appear to adversely affect clinical and health-related QoL outcomes.

Whether adding fusion in elderly patients undergoing lumbar decompression increases the complication rate remains a matter of debate [2,28]. It is to be expected that greater comorbidity, with its associated increased risk of complications, along with the inferior bone quality in the elderly might lead to an increase in the overall complication rate. While some authors have found alarmingly high rates of perioperative complications after arthrodesis in older patients [4,5] others have reported similar complication rates in older and younger patients [8,23,26] . Deyo et al reported that patients undergoing fusion have a 1.9 fold greater complication rate than those who undergo surgery without fusion (mean age of patients was 72 years) [2]. On the other hand, Casinelli reported that the addition of instrumentation does not increase the complication rate [28].

Our data supports the notion that the incidence of medical complications is higher in geriatric patients. It is possible that, in the present study, this was due to the higher comorbidity in the geriatric group, because age is inevitably associated with increased comorbidity, and the latter is strongly related to complication rates [1,29]. A large analysis of over 20`000 cases from the Scoliosis Research Society Morbidity and Mortality database revealed that higher ASA status correlated with greater postoperative morbidity and mortality rates [30]. In a large series comprising >3`500 patients with degenerative lumbar disorders it was shown that the ASA grade has an independent effect on both complications and outcome [1]. Although age was associated with an increase in comorbidity, the effect of comorbidity on complications and outcome was not just an effect of age [1]. Age positively correlated with an increase in complication risk in a prospective assessment of 87 consecutive patients undergoing elective surgery for degenerative thoracolumbar pathologies [31], although it was not clear whether age was simply a surrogate measure of comorbidity. In a large retrospective analysis of 174 patients >70 years and 311 patients <65 years of age multiple regression analysis revealed increased age as important risk factor for perioperative complications in patients undergoing lumbar spinal fusion.
Again, however, comorbidity was not included as a possible covariate. A most recent review has highlighted that complications are more common in patients aged 65–70 years or older [29].

In keeping with previous studies showing that the length of hospital stay (LOS) after spinal surgery increases with higher comorbidity status [3] and advanced age [23], we found a higher LOS in the more advanced age groups (significant for the “older” group) than in the working age (“younger”) population.

The large number of consecutive patients and high response rate for completed questionnaires, in combination with the systematic manner of prospective data collection, strengthen the significance of the findings of the presented study. These data should not be

interpreted as evidence that fusion procedures are safe and result in good outcomes in all older patients with painful degenerative conditions. Instead, the study suggests that with careful patient selection it is possible to achieve satisfactory patient-rated outcomes despite the higher incidence of medical complications, greater comorbidity, and higher complication rates associated with geriatric age groups.

*Limitations*

The presented study did not consider the potential confounding effect of specific factors such as bone density, body weight, medication (anticoagulants, steroids), diabetes mellitus, other chronic illnesses, malnutrition, or smoking status. We considered that the overall general physical health status was reflected by the ASA score. In addition, the results need to be interpreted with caution, given the small number of geriatric patients. Studies with larger numbers of patients are needed to confirm our findings.

**Patient-rated outcomes of lumbar fusion in patients with degenerative disease of the lumbar spine: does age matter?**

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**Figure legend**

**Figure 1 -** ***Patient-rated outcomes for the three age-groups over time***
Pain is measured on a graphic rating scale ranging from 0 to 10 with the descriptor extremes 0="no pain at all" and 10="my pain is as bad as it could possibly be". "Worst pain" is the higher of the two pain scores (back pain and leg/buttock pain). The multidimensional COMI score is given on a scale ranging from 0 to 10 while functional outcome, disability, symptom-specific well-being (SSWB), and quality of life (QoL) are represented by a scale ranging from 1 to 5. In each case, a higher score indicates a worse status.

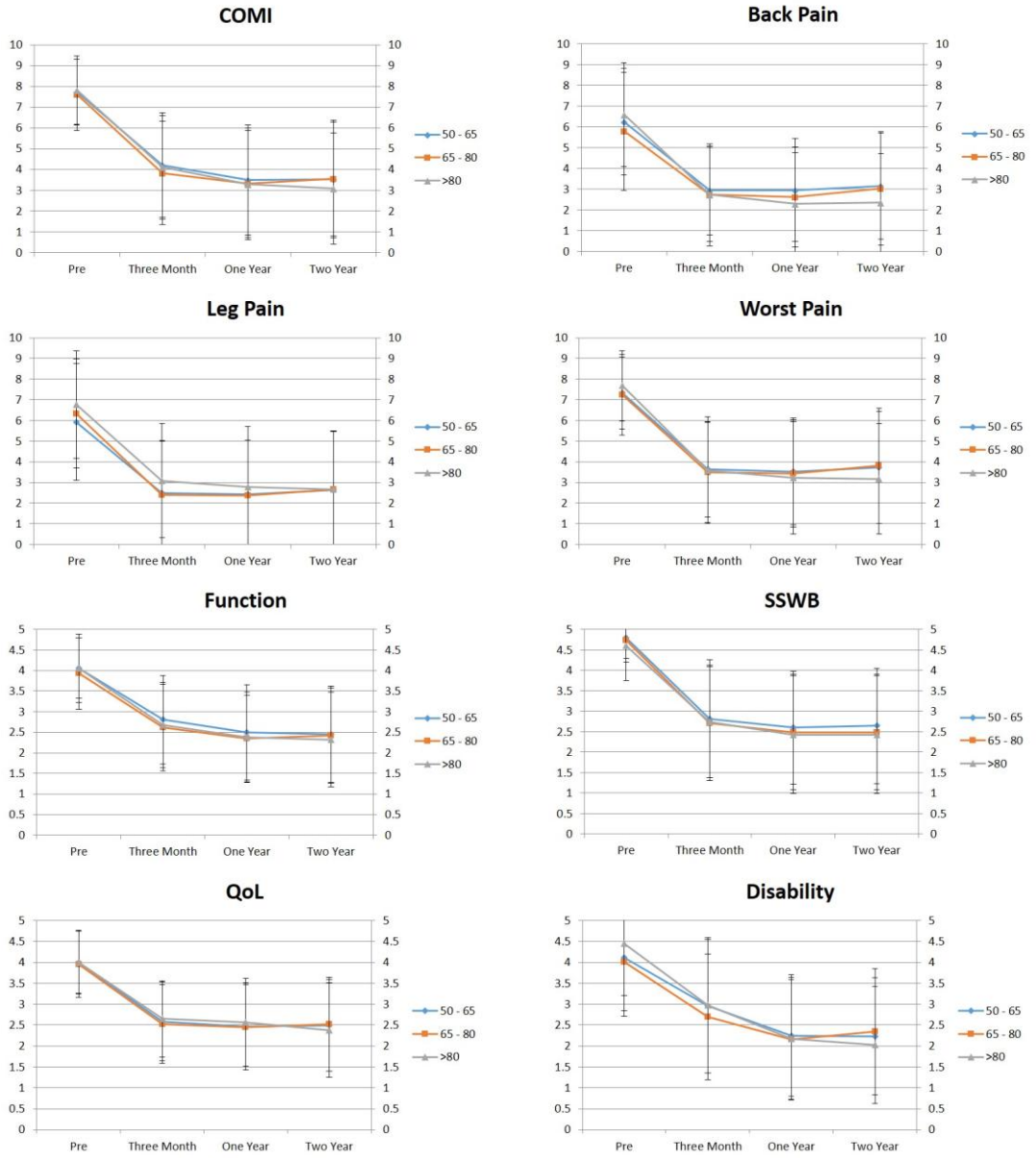

**Table 1 -** ***Baseline characteristics of the three age-groups***

| Variable | Age group | | | P value (for difference among groups) |
|---|---|---|---|---|
| | ≥50y <65y | ≥65y <80y | ≥ 80y | |
| N | 317 | 350 | 40 | |
| Age (mean (SD) yrs) | 58.4 (4.3) | 71.9 (4.2) | 82.5 (2.3) | <.0001 |
| Gender (number (%) male) | 104 (33%) | 103 (29%) | 22 (28%) | 0.57 |
| Comorbidity status (%) | | | | |
| % ASA 1 | 0 | 0 | 0 | |
| % ASA 2 | 25 | 6 | 0 | <0.0001 |
| % ASA 3 | 64 | 63 | 60 | |
| % ASA 4 | 11 | 31 | 40 | |
| Baseline back pain on 0-10 scale (mean (SD)) | 6.4 (2.6) | 5.9 (2.8)* | 6.7 (2.4) | 0.03 |
| Baseline leg pain on 0-10 scale (mean (SD)) | 5.9 (2.8) | 6.3 (2.7) | 6.7 (2.7) | 0.08 |
| Baseline worst pain (either back or leg) on 0-10 scale (mean (SD)) | 7.4 (1.7) | 7.3 (2.0) | 7.7 (1.6) | 0.26 |
| Baseline function on 1-5 scale (mean (SD)) | 4.1 (0.8) | 4.0 (0.9) | 4.1 (0.7) | 0.17 |
| Baseline symptom-specific well-being on 1-5 scale (mean (SD)) | 4.8 (0.5) | 4.8 (0.5) | 4.7 (0.8) | 0.20 |
| Baseline general quality of life on 1-5 scale (mean (SD)) | 4.0 (0.8) | 4.0 (0.8) | 4.1 (0.7) | 0.67 |
| Baseline disability (social and work) on 1-5 scale (mean (SD)) | 3.7 (1.3) | 3.7 (1.4) | 4.0 (1.3) | 0.37 |
| COMI sum score on 0-10 scale (mean (SD)) | 7.8 (1.6) | 7.6 (1.7) | 7.9 (1.6) | 0.35 |

* = significant different from age-group >50y≤65y (p=0.03).

**Table 2 -** ***Surgical characteristics of the three age-groups***

| **Variable** | **Age group** | | | **p value** (for difference among groups) |
|---|---|---|---|---|
| | **≥50y <65y** | **≥65y <80y** | **≥ 80y** | |
| N | 317 | 350 | 40 | |
| Extent of lesion (% with > 1 level pathology) | 50.5 | 62.0* | 50.0 | 0.008 |
| Operation duration (%): | | | | |
| 1-2 hrs | 2.5 | 3.7 | 0 | |
| 2-3 hrs | 36.0 | 33.7 | 30.0 | |
| 3-4 hrs | 36.3 | 40.6 | 50.0 | |
| 4-5 hrs | 16.7 | 12.9 | 12.5 | 0.48 |
| 5-6 hrs | 6.3 | 7.7 | 2.5 | |
| 6-8 hrs | 1.9 | 1.1 | 5.0 | |
| 8-10 hrs | 0 | 0.3 | 0 | |
| >10 hrs | 0.3 | 0 | 0 | |
| Blood loss (%): | | | | |
| none | 0† | 0 | 2.5 | |
| < 500 ml | 53.6 | 47.4 | 40.0 | 0.002 |
| 500-1000ml | 37.6 | 42.6 | 50.0 | |
| 1000-2000ml | 8.5 | 8.9 | 5.0 | |
| >2000ml | 0.3 | 1.1 | 2.5 | |
| Medical complications (%) | | | | 0.01 |
| - All§ | 7.3 | 13.4* | **17.5‡** | |
| - Anesthesiological | 0.3 | 0 | 0 | |
| - Cardiovascular | 2.5 | 3.1 | 7.5 | |
| - Pulmonary | 0 | 2.3 | 2.5 | |
| - Cerebral | 0 | 0.9 | 5 | |
| - Kidney/Urinary | 1.3 | 5.4 | 10 | |

| | | | | |
|---|---|---|---|---|
| - Liver/GI | 1.3 | 1.1 | 0 | |
| - Other | 2.8 | 3.1 | 0 | |

| | | | | |
|---|---|---|---|---|
| Surgical complications (%) | | | | |
| - All§ | 6.6 | 6.0 | 15.0 | 0.09 |
| - Bleeding outside spinal canal | 0 | 0.6 | 2.5 | |
| - Malposition of implant | 0.6 | 0 | 0 | |
| - Nerve root damage | 0.3 | 0 | 0 | |
| - Duralesion | 3.5 | 2.9 | 10 | |
| - Wound infection | 1.6 | 0.6 | 0 | |
| - Implant failure | 1.3 | 0.3 | 2.5 | |
| - Other | 0.3 | 2 | 2.5 | |
| Duration of hospital stay (mean (SD) days) | 10.0 (3.6) | 10.8 (3.7)* | 11.3 (4.9) | 0.009 |

* = significant difference in value or distribution of values compared with >50y≤65y group (p=0.006).
‡ = significant difference in value or distribution of values compared with >50y≤65y (p=0.007).
† = significant difference in value or distribution of values compared with >80y (p=0.007).
§ = please note that a single patient can have multiple complications

**Table 3 -** ***Patient-rated outcomes at one-year follow-up for the three age-groups***

| **Variable** | **Age group** | | | **p value** (for difference among groups) |
|---|---|---|---|---|
| | **≥50y <65y** | **≥65y <80y** | **≥ 80y** | |
| N | 275 | 317 | 35 | |
| Follow-up rate (%) | 90.8 | 91.1 | 87.5 | 0.75 |
| Global outcome (%):<br>good<br>poor | <br>83.3<br>16.7 | <br>84.6<br>15.4 | <br>82.9<br>17.1 | 0.89 |
| Satisfaction (%):<br>good<br>poor | <br>89.2<br>10.8 | <br>90.3<br>9.7 | <br>88.6<br>11.4 | 0.89 |
| Reoperation (%):<br>different level<br>same level | <br>1.4<br>3.1 | <br>0<br>2.8 | <br>2.8<br>0 | 0.14 |
| Reduction in COMI domain scores from preoperative to one year postoperative: | | | | |
| Back pain on 0-10 scale (mean (SD)) | 3.2 (3.0) | 3.1 (3.1) | 4.2 (3.1) | 0.14 |
| Leg pain on 0-10 scale (mean (SD)) | 3.3 (3.4) | 3.9 (3.2) | 3.9 (3.1) | 0.09 |
| Worst pain (either back or leg) on 0-10 scale (mean (SD)) | 3.7 (2.8) | 3.8 (2.8) | 4.4 (3.0) | 0.40 |
| Function on 1-5 scale (mean (SD)) | 1.5 (1.2) | 1.6 (1.2) | 1.6 (1.2) | 0.78 |
| Symptom-specific well-being on 1-5 scale (mean (SD)) | 2.1 (1.5) | 2.3 (1.5) | 2.2 (1.6) | 0.61 |
| General quality of life on 1-5 scale (mean (SD)) | 1.5 (1.2) | 1.5 (1.1) | 1.4 (1.0) | 0.91 |
| Disability (average, social and work) on 1-5 scale (mean (SD)) | 1.7 (1.6) | 1.7 (1.5) | 2.0 (1.6) | 0.40 |
| COMI sum score on 0-10 scale (mean (SD)) | 4.1 (2.7) | 4.2 (2.6) | 4.5 (2.7) | 0.71 |